CORRESPONDENCE.

ON THE FACILITIES AFFORDED BY CERTAIN LOGARITHMIC TABLES.

To the Editor of the Assurance Magazine.

SIR,—I shall be glad to be allowed to present to your readers certain considerations on the subject of logarithm tables, and to bring under their notice two works which are not so well known as I think they deserve to be.

For many of the purposes to which logarithms are applied, five figures of a tabular result are sufficient. Most people, however, I fancy, when five figures are required, instead of using for this purpose the five-figure table, will have recourse at once to the seven-figure; and that for the following reasons:—first, the somewhat troublesome interpolation for the fifth figure is avoided; and secondly, the results are more correct; since, from the nature of the case, five-figure logarithms cannot, in a majority of instances, give five-figure numbers true to the nearest unit.* To have five figures true in numbers we must, as a rule, use six-figure logarithms. Now, there are plenty of six-figure tables (of which the best is Mr. Farley's); but, extending only to 10,000, they have, like the five-figure tables, but a four-figure argument, and interpolation is still required for the fifth figure. To obviate this inconvenience then, and at the same time avoid the incumbrance of the seventh figure (which, by hypothesis, we do not need), what we want is a six-figure table, with a five-figure argument; that is, in other words, where the numbers extend, as in the seven-figure tables, to 100,000.

It is the object of the present communication to call attention to two sets of tables possessing the qualifications just specified, and to recommend them to those who desire to enjoy all the comfort and convenience in the use of tables that the case admits of.

The title of the first, in full, is—

> "Logarithmi VI. Decimalium scilicet Numerorum ab 1 ad 100,000 et Sinuum et Tangentium ad 10″ quibus additi sunt varii Logarithmi et numeri, sæpius in Mathesi adhibiti, curante Dr. George Frederico Ursino." Hafniæ [Copenhagen], 1827.

The title sufficiently details the contents of the book, and I have therefore only to speak of the manner of its execution.

It is the table of logarithms of numbers with which we have chiefly here to do. The arrangement is that of our standard tables, except that here there are only 40 lines in a page, which, accustomed as we are to 50, is somewhat of a drawback. The change of the leading figures is indicated by a *bar* placed over the fourth figure of the *first* logarithm to which the new leading figures belong; but the indication is not, as in Hutton and Babbage, continued to the end of the line. This can easily be done with the pen. The type is modern—uniform in height—but it is large and very

* Any to whom this proposition is new may satisfy themselves of its truth, if they will, with a five-figure table, form the logarithms of, say, 86,570 to 86,580. They will find that, in several cases, different numbers give the same logarithm; so that, conversely, when one of these logarithms is given, it cannot be predicated, with certainty, to which of the two numbers that will produce it it belongs in the case in hand.

distinct. There are neither differences nor proportional parts, so that if a *sixth* figure in the number is to be taken account of, the operation will be a little troublesome.* I believe the table to be very correct. I have used it very extensively, and have found no cause to suspect the existence of error.

The trigonometrical portion of the work consists of the logarithmic sines and tangents for every 10 seconds of the quadrant, with their differences; and provision is made for forming, by a very simple operation, and with the utmost exactitude, the same functions belonging to small arcs. There is also, along with some minor tables, a table of natural sines and tangents, to every 10 minutes of the quadrant.

The title of the second work I desire to bring under notice is—

> "Logarithmisch-Trigonometrische Tafeln mit sechs Decimalstellen. Mit Besonderer Berücksichtigung für den Schulgebrauch bearbeitet von Dr. C. Bremiker." Berlin, 1860.

The arrangement of the table of logarithms of numbers here is in entire accordance with that of our standard tables, 50 lines in a page, and full proportional parts, by aid of which the sixth figure of the number (and seventh where practicable) may be taken account of. The indication of change in the leading figures too (a *bar*) is continued to the end of the line The changes in this table, however, are, in number, only one-tenth part of those in most other six and seven-figure tables, as here they consist of only two figures, the remaining *four* being inserted in the columns. The type is of the old style, with heads and tails; and it is beautiful, and beautifully distinct. The paper too is excellent, but unsized.

In the trigonometrical portion we have logarithmic sines and tangents for every 10 seconds of the quadrant (with differences and proportional parts); and for the first four degrees the same for every second, with the means also, as in Ursin's work, of forming them with the greatest precision for small arcs. The minor tables relate to the figure of the earth, and weights, measures, and monies. I believe the work to be very correct; but not having used it much I cannot certify it to be so. I hear a good character of it, however, in this respect, from those who have used it.

Of the two works I have sought to describe, I dare say the second will, by most people, be considered the one to be preferred. Both can be obtained, I suppose, through any foreign bookseller.† I have had occasion recently to procure several copies of that last referred to, and they have been got for me by Mr. Nutt, of the Strand; the price being four shillings per copy. I cannot recall the price I paid for the other.

I am, Sir,

Your obedient servant,

Camden Town,
26th Nov., 1863.

P. GRAY.

* I have inserted proportional parts, in my own copy, with the pen—an operation of easy performance, since the paper is remarkably stout and well sized.

† Ursin's work appears to have been published by subscription. In the list of subscribers I find "Mr. Babbage, Esq.," and "Mr. Baily, Esq." It occurs to me, while penning this note, that it is Mr. Baily's copy that I possess. The book is, I believe, still accessible; at least it was so some years ago, when I procured copies for several of my friends, also, I think, through Mr. Nutt.